an intelligent motor control processor, coupled to receive encoder signals from a respective incremental encoder, the intelligent motor control processor calculating and outputting motor control commands in operative response thereto; and

a command processor operatively coupled to the motor portions, the command processor receiving an input representing a position of a desired viewing object, the position characterized in terms of a celestial coordinate system, the command processor further receiving an input representing a present position of the telescope, the telescope position characterized in terms of a rectangular coordinate system, the command processor calculating a rotational movement about each of the respective axes to move the telescope from its present position to the position of the desired viewing object and outputting each axial rotational movement to a respective motor control processor as motor movement commands;

E1 (continued)

wherein each motor control processor translates received motor movement commands into motor control commands, each motor control processor commanding motor movement and receiving encoder signals corresponding to actual motor movement, the motor control processor processing received encoder signals to calculate an actual extent of motor movement.--

--55. The telescope system according to claim 54, each motor control processor further comprising:

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a position register, the register storing a calculated actual extent of motor movement; and

wherein each motor control processor provides its register contents to the command processor, the command processor translating the register contents into telescope angular displacement about the corresponding axis to calculate thereby a present telescope position.--

Sub. F2

--56. The telescope system according to claim 55, wherein the signals output by the incremental encoder correspond to increments of the encoder, a timing between increments corresponding to a speed of movement and an amount of increments corresponding an extent of movement.--

--~~57~~ 3. The telescope system according to claim ~~56~~ 2, wherein the incremental encoder comprises an optical encoder operating in quadrature, the motor control processor processing the quadrature signal to determine motor speed and motor rotation direction.--



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--~~58~~ 4. The telescope system according to claim ~~57~~ 3, wherein the motor control processor increments the position register with a received extent of movement when the motor rotates in a first direction and wherein the motor control processor decrements the position register with a received extent of movement when the motor rotates in a second direction.--

Sub F3

--59. The telescope system according to claim 55, further comprising:

a celestial object database coupled to the command processor, the database containing entries each associating a celestial object with a corresponding set of celestial coordinates; and

wherein the command processor receives an input corresponding to a desired celestial object to view, the command processor accessing the corresponding set of celestial coordinates from the database, the command processor further processing the celestial coordinates and rectangular coordinates representing the present position of the telescope system so as to calculate a dynamic movement profile for each axis so as to track the desired celestial object's motion.--

E1 (continued)

--~~60~~ 6. The telescope system according to claim ~~59~~ 5, wherein the command processor translates each axis' dynamic movement profile into motor speed and direction commands and outputs said motor commands to the corresponding motor control processor, the motor control processor controlling motor movement in response thereto, thereby freeing the command processor to perform further processing and calculation tasks during telescope movement.--

Sub F4

--61. An automated telescope system of the type including a telescope mounted for rotation about an altitude and an azimuth axis, the automated telescope system comprising:

a command processor, the command processor receiving an input representing a position of a desired viewing object, the position characterized in terms of a celestial coordinate system, the command processor translating the input into a position characterized in terms of an altitude/azimuth coordinate system, the command processor calculating an amount of movement about each axis, to move the telescope from a present position to a desired position which points the telescope at the desired viewing object, the command processor outputting motor movement commands for each respective axis; and

two intelligent motor portions, each coupled to rotate the telescope about a respective one of the axes, each motor portion including :



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a motor having a rotatable shaft;

a motion indicator coupled to the motor, the motion indicator developing motion indication signals corresponding to actual motor movement; and

an intelligent motor control processor, coupled to the motor and the motion indicator, the motor control processor further coupled to receive motor movement commands from the command processor, the motor control processor processing each respective motor movement command into motor control commands defining operational movement of the motor, the motor control processor further receiving motion indication signals and comparing actual operational movement of its respective motor to commanded operational movement, the motor control processor modifying motor control commands in response to differences therebetween.--

E1 (continued)

--62. The telescope system according to claim 61, the motor control processor further comprising:

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a position register, the register storing a calculated actual extent of motor movement; and

wherein the motor control processor provides the register contents to the command processor, the command processor translating the register contents into telescope angular displacement about the corresponding axis and thereby into a present telescope position.--

Sub F5

--63. The telescope system according to claim 62, wherein the motion indicator comprises an incremental encoder, the motion indication signals corresponding to increments of the encoder, a timing between increments corresponding to a speed of movement and an amount of increments corresponding an actual extent of movement.--

--~~64~~ 9. The telescope system according to claim ~~63~~ 8, wherein the incremental encoder comprises an optical encoder operating in quadrature, the motor control processor processing the quadrature signal to determine motor speed and motor rotation direction.--

--~~65~~ 10. The telescope system according to claim ~~64~~ 9, wherein the motor control processor increments the position register with an actual extent of movement when the motor rotates in a first direction and wherein the motor control processor decrements the position register with an actual extent of movement when the motor rotates in a second direction.--



E

Sub F6 --66. ~~The telescope system according to claim 62,~~ further comprising:

a geographic location database coupled to the command processor, the database containing entries each associating a geographic place name with a corresponding set of earth-based coordinates; and

wherein the command processor receives a place name input corresponding to a geographic location proximate to a user, the command processor processing the corresponding set of earth-based coordinates and the contents of both motor controller's position registers so as to determine the present position of the telescope system with respect to the celestial coordinate system.--

11. --~~67~~ 12. The telescope system according to claim ~~66~~ 11, further comprising:

a celestial object database coupled to the command processor, the database containing entries each associating a celestial object with a corresponding set of celestial coordinates; and

E1 (continued)

wherein the command processor receives an input corresponding to a desired celestial object to view, the command processor processing the corresponding set of celestial coordinates and the present position of the telescope system so as to calculate an amount of altitude and azimuth axis movement sufficient to point the telescope to the desired celestial object, the command processor further calculating a dynamic movement profile for each axis so as to track the desired celestial object's motion.--

--~~68~~ 13. The telescope system according to claim ~~67~~ 12, wherein the command processor translates each axis' dynamic movement profile into motor speed and direction commands and outputs said motor commands to the corresponding motor control processor, the motor control processor controlling motor movement in response thereto, thereby freeing the command processor to perform further processing and calculation tasks during telescope movement.--

Sub F7 --69. In an automated telescope system of the type including a telescope mounted for rotation about two substantially orthogonal axes, a method for operating the system comprising:

retrieving an input representing a position of a desired viewing object, the position characterized in terms of a celestial coordinate system;

processing the input in a command processor into a position characterized in terms of a rectangular coordinate system, the command processor determining a present position about each axis, and calculating a displacement in the rectangular coordinate system for each axis to point the telescope at the desired viewing object;

E

processing each axial displacement into motor movement commands for that axis;

outputting each motor movement command to a corresponding motor control processor coupled to that axis;

processing each respective motor movement command, in each said respective motor control processor, into motor control commands defining operational movement of a motor coupled to each respective axis;

operating each motor in accordance with its motor control commands;

evaluating actual operational movement of each motor; and

wherein each respective motor control processor compares actual operational movement of its respective motor to commanded operational movement and modifies motor control commands in response to differences therebetween.--

F1 (continued)

--70. The method according to claim 69, actual operational movement of each motor evaluated by a motion sensor, the sensor developing motion indication signals corresponding to an amount of motor rotational movement, the method further comprising:

reading an amount of motor rotational movement;

calculating a total amount of motor movement;

recording the total amount as a content of a position register;

providing the register contents to the command processor; and

wherein the command processor translates the register contents into telescope angular displacement about the corresponding axis and thereby a present telescope position.--

Sub F8

--71. The method according to claim 70, wherein the motion sensor comprises an incremental encoder, the motion indication signals corresponding to increments of the encoder, a timing between increments corresponding to a speed of movement and an amount of increments corresponding an extent of movement--

16 --~~72~~. The method according to claim 15 ~~71~~, wherein the incremental encoder comprises an optical encoder operating in quadrature, the motor control processor processing the quadrature signal to determine motor speed and motor rotation direction.--



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17 --~~73~~. The method according to claim ~~72~~ 16, further comprising:

incrementing the contents of the position register with an extent of movement when the motor rotates in a first direction; and

decrementing the contents of the position register with an extent of movement when the motor rotates in a second direction.--

Sub F8

E1 (continued)

--74. The method according to claim 70, further comprising:

accessing a celestial object database coupled to the command processor, the database containing entries each associating a celestial object with a corresponding set of celestial coordinates; and

providing an input corresponding to a desired celestial object to view;

providing the corresponding set of celestial coordinates from the database;

retrieving the corresponding set of celestial coordinates and the present position of the telescope system so as to calculate an amount of altitude and azimuth axis movement sufficient to point the telescope to the desired celestial object;

calculating a dynamic movement profile for each axis so as to track the desired celestial object's motion.

translating each axis' dynamic movement profile into motor speed and direction commands; and

outputting said motor commands to the corresponding motor control processor, wherein the motor control processor controls motor movement in response thereto, thereby freeing the command processor to perform further processing and calculation tasks during telescope movement.--

19 --~~75~~. In an automated telescope system of the type including motors coupled to rotate the telescope about an altitude axis and an azimuth axis, a method for operating the system comprising:

activating a command processor, the command processor performing the steps of:

retrieving an input representing a position of a desired viewing object, the position of the desired viewing object characterized in terms of a celestial coordinate system;

calculating a present position of the telescope, the present position characterized in terms of a rectangular coordinate system;



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calculating an amount of movement by the telescope, in said rectangular coordinate system, about each axis which will point the telescope at the desired viewing object;

translating a movement amount for each axis into a motor movement command for that axis; and

providing each axial motor movement command to a motor control processor coupled to operate that axis' respective motor;

operating an altitude and an azimuth motor control processor, each coupled to the respective axis, each motor control processor performing the steps of:

translating axial motor movement commands received from the command processor into motor control commands;

operating each axis' motor in response to its respective motor control commands;

receiving signals corresponding to actual motor rotational movement, said signals sensed by an incremental encoder coupled to the motor;

establishing a record of its respective motor's total rotational movement; and

providing the record of each motor's total rotational movement to the command processor; and

wherein the command processor translates each record into telescope angular displacement about the respective axis and, thereby the present position vector of the telescope.--

E1 (continued)

--~~76~~ 20. The method according to claim ~~75~~ 19, the command processor further performing the steps of:

calculating a dynamic movement profile for each axis so as to track the desired celestial object's motion;

translating each axis' dynamic movement profile into motor speed and direction commands for each axis; and

outputting said motor commands to the corresponding motor control processor for that axis, wherein the motor control processor controls motor movement in response thereto, thereby freeing the command processor to perform further processing and calculation tasks during telescope movement.--

Sub F10

--77. An automated telescope system of the type including a telescope mounted for rotation about two substantially orthogonal axes, the automated telescope system comprising:



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first and second motor portions, each coupled to rotate the telescope about a respective one of the axes, each motor portion including:

a motor having a rotatable shaft;

an encoder coupled to the motor shaft, the encoder outputting signals corresponding to an amount of movement of its respective motor; and

a motor control processor, configured to receive encoder signals from a respective encoder, the motor control processor calculating and outputting motor control commands in operative response thereto; and

a command processor operatively connected to the motor portions, the command processor receiving an input corresponding to a position of a desired viewing object, the command processor further receiving an input corresponding to present position of the telescope, the command processor calculating a rotational movement about each of the respective axes to move the telescope from its present position to the position of the desired viewing object and outputting a corresponding motor movement command to each respective motor control processor;

wherein each motor control processor translates received motor movement commands into motor control commands, each motor control processor commanding motor movement and receiving encoder signals corresponding to actual motor movement, the motor control processor processing received encoder signals to calculate an actual extent of motor movement.--

E1 (continued)

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--~~78~~. The telescope system according to claim ~~77~~ 21, wherein the input corresponding to a position of a desired viewing object is characterized in terms of a celestial coordinate system.--

23

--~~79~~. The telescope system according to claim ~~78~~ 22, wherein the input corresponding to a present position of the telescope is characterized in terms of a rectangular coordinate system.--

--80. The telescope system according to claim 77, each motor control processor further comprising:

F

a position register, the register storing a calculated actual extent of motor movement; and

wherein each motor control processor provides its register contents to the command processor, the command processor translating the register contents into telescope angular displacement about the corresponding axis to calculate thereby a present telescope position.--



E

E1 (continued)

24 ~~--81.~~ The telescope system according to claim 21 ~~77~~, wherein the signals output by the encoder correspond to increments of the encoder, a timing between increments corresponding to a speed of movement and an amount of increments corresponding to an extent of movement.--

25 ~~--82.~~ The telescope system according to claim 24 ~~81~~, wherein the incremental encoder comprises an optical encoder operating in quadrature, the motor control processor processing the quadrature signal to determine motor speed and motor rotation direction.--

26 ~~--83.~~ The telescope system according to claim 25 ~~82~~, wherein the motor control processor increments the position register with a received extent of movement when the motor rotates in a first direction and wherein the motor control processor decrements the position register with a received extent of movement when the motor rotates in a second direction.--

27 ~~--84.~~ The telescope system according to claim 26 ~~83~~, wherein the automated telescope system is of the type including a telescope mounted for rotation about an altitude and an azimuth axis.--

28 ~~--85.~~ The telescope system according to claim 21 ~~77~~, further comprising:

a celestial object database coupled to the command processor, the database containing entries each associating a celestial object with a corresponding set of celestial coordinates; and

wherein the command processor receives an input corresponding to a desired celestial object to view, the command processor processing the corresponding set of celestial coordinates and the present position of the telescope system so as to calculate an amount of altitude and azimuth axis movement sufficient to point the telescope to the desired celestial object.--

29 ~~--86.~~ The telescope system according to claim 28 ~~85~~, wherein the command processor further calculates a dynamic movement profile for each axis so as to track the desired celestial object's motion.--

30 ~~--87.~~ The telescope system according to claim 29 ~~86~~, wherein the command processor translates each axis' dynamic movement profile into motor speed and direction commands and outputs said motor commands to the corresponding motor control processor, the motor control processor controlling motor movement in response thereto, thereby freeing the command processor to perform further processing and calculation tasks during telescope movement.--



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--~~88~~ 31. The telescope system according to claim ~~87~~ 30, further comprising:

a geographic location database accessible to the command processor, the database containing entries each associating a geographic place name with a corresponding set of earth-based coordinates; and

wherein the command processor receives a place name input corresponding to a geographic location proximate to a user, the command processor processing the corresponding set of earth-based coordinates and the contents of both motor controllers' position registers so as to determine the present position of the telescope system with respect to the spherical coordinate system.--

E (continued)

--89. An automated telescope system of the type including a telescope mounted for rotation about two substantially orthogonal axes, the automated telescope system comprising:

first and second motor portions, each coupled to rotate the telescope about a respective one of the axes, each motor portion including:

a motor having a rotatable shaft;

an encoder coupled to the motor shaft, the encoder outputting signals corresponding to a position of its respective motor; and

a motor control processor, configured to receive encoder signals from a respective encoder, the motor control processor calculating and outputting motor control commands in response thereto; and

F

a command processor operatively connected to the motor portions, the command processor receiving an input corresponding to a position of a desired viewing object, the command processor further receiving an input corresponding to a present position of the telescope, the command processor calculating a rotational movement about each of the respective axes to move the telescope from its present position to the position of the desired viewing object and outputting a corresponding motor movement command to each respective motor control processor;

wherein each motor control processor translates received motor movement commands into motor control commands, each motor control processor commanding motor movement and receiving encoder signals corresponding to actual motor position.--

--90. The telescope system according to claim 89, wherein the input corresponding to a position of a desired viewing object is characterized in terms of a celestial coordinate system.--

--91. The telescope system according to claim 90, wherein the input corresponding to a present position of the telescope is characterized in terms of a rectangular coordinate system.--



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--92. The telescope system according to claim 91, wherein the automated telescope system is of the type including a telescope mounted for rotation about an altitude and an azimuth axis.--

--93. The telescope system according to claim 89, further comprising:

a celestial object database coupled to the command processor, the database containing entries each associating a celestial object with a corresponding set of celestial coordinates; and

wherein the command processor receives an input corresponding to a desired celestial object to view, the command processor processing the corresponding set of celestial coordinates and the present position of the telescope system so as to calculate an amount of altitude and azimuth axis movement sufficient to point the telescope to the desired celestial object.--

E1 (concluded)

--94. The telescope system according to claim 93, wherein the command processor further calculates a dynamic movement profile for each axis so as to track the desired celestial object's motion.--

--95. The telescope system according to claim 94, wherein the command processor translates each axis' dynamic movement profile into motor speed and direction commands and outputs said motor commands to the corresponding motor control processor, the motor control processor controlling motor movement in response thereto, thereby freeing the command processor to perform further processing and calculation tasks during telescope movement.--

--96. The telescope system according to claim 95, further comprising:a geographic location database accessible to the command processor, the database containing entries each associating a geographic place name with a corresponding set of earth-based coordinates; and

wherein the command processor receives a place name input corresponding to a geographic location proximate to a user, the command processor processing the corresponding set of earth-based coordinates and the contents of both motor controllers' position registers so as to determine the present position of the telescope system with respect to the spherical coordinate system.--

automatically inputting a time parameter. This structure corresponds to the processing elements which define the distributive intelligence of the telescope system according to the invention. Krewalk, on the other hand, requires incorporation of a personal computer (PC 196) to be incorporated within the disclosed telescope system in order to carry out these tasks. Accordingly, the Krewalk structure does not correspond to the structure set forth in the specification, and cannot therefore be construed as disclosing the claimed means for performing the claimed functions when those means are construed in accordance with 35 USC Section 112, paragraph 6.

Notwithstanding the foregoing, dependent Claims 21-24 partake of the novelty of independent Claim 20 as discussed above. Since the novelty of the present invention resides in the distributive nature of the telescope's intelligence and since Krewalk does not disclose, suggest or infer this distributive intelligence, Krewalk cannot be construed as disclosing any of the inventive features which flow therefrom.

Applicants therefore believe that independent Claim 20 and dependent Claims 21-24 are patentable over Krewalk and respectfully solicit reconsideration and withdrawal of the rejection of those claims under 35 USC Section 102(b).

Claims 6, 7 and 8 were rejected on 35 USC Section 103(a) for obviousness over Krewalk, in view of US Patent No. 5,822116 to Leblanc. In giving the rejection, the Examiner asserts that Krewalk discloses all of the features of the claim invention with the exception of motor control processors for commanding motor movement in evaluating optical and encoder feedback information. LaBlanc is relied upon to remedy this deficiency in Krewalk. Applicants respectfully traverse this rejection.

Initially, the Examiner asserts that Krewalk concludes an optical encoder which defines motor feedback information signals and points to Krewalk's occulting disc in FIG. 7 for support. Applicants disagree with the Examiner's characterization of Krewalk's occulting disc. As

described in the Krewalk specification from column 21, line 60 to column 22, line 12, the occulting disc does nothing more than define a region, bounded by edges (142b), which define the range of motion of the telescope system. When the edges are interposed between an intermitter and a sensor, the telescope motor ceases because its axial range of motion is now constrained. Once within the edges, however, the telescope is free to range through an arc of approximately 155° during which time the sensor is not eclipsed and no signals are provided.

This is not an optical encoder. Optical encoders provide motor movement feedback information regardless of where the telescope is along its axial arc. Any motion of the telescope axis will cause a corresponding signal to be derived from an optical encoder. All Krewalk is able to do is indicate whether a telescope is "in" or "out" of its arcuate range. Krewalk is unable to measure telescope movement within the range and is not able to develop motor movement feedback signals.

As mentioned above, with regard to independent Claim 20, the Krewalk reference relies upon the use of stepper motors to effect telescope rotation. To effect a large telescope movement, a series of stepper pulses are issued to a stepper motor, without regard as to how many steps the stepper motor actually takes. It is assumed that since a certain number of pulses were issued, that number of steps were taken. However, there is no disclosure of any apparatus or structure in the Krewalk reference that can verify that the stepper motor even received the required number of pulses, much less that it moved in the required number of steps, and even less that the telescope axis actually reflected the desired amount.

The telescope system in accordance with the invention includes motor portions that in turn include an intelligent motor control processor (in acknowledged contrast to Krewalk) which command motor movement and evaluate optical encoder feedback signals. Applicants would suggest that providing such functionality to the Krewalk apparatus would make that apparatus considerably more complex. To begin with, in order to control each of the axes independently, the Krewalk apparatus would have to be provided with a central command processor which

translates user inputs into telescope position commands which would be independently issued to each of the two motor control processors. In addition, in order to ensure the top-level commands received from a central command unit were executed correctly, each of the motor control processors would require some means to register the actual arcuate movement of its respective axis. Once this additional structure (not at all disclosed or suggested Krewalk) is added to Krewalk, one begins to perceive the automated telescope system according to invention. Thus, adding undisclosed and unsuggested functionality and structure to the Krewalk apparatus, in order to give it the same functionality as the invention, constitutes impermissible hindsight resulting in a structure that is only obvious once recourse has been had to the present application.

The Lablanc reference is relied upon in order to remedy this deficiency in Krewalk. However, upon detailed examination of the Lablanc reference, Applicants are unable to discern any disclosure or suggestion of first and second motor portions, each portion including a motor, an optical encoder and an intelligent motor control processor for commanding motor movement and evaluating optical encoder feedback signals.

The Examiner asserts that Servo control loops 101 and 102 in the Lablanc reference correspond to the aforementioned required elements of independent Claim 6. Applicants respectfully disagree. Lablanc discloses a rack and pinion motor system for high-speed movement, supplemented with a voice coil type motor with a limited travel for making final adjustments. Lablanc's voice coil motor is controlled by a Servo loop which compares signals from sensors with set point values in order to keep the motor centered on its travel. Lablanc's Servo loops do not command motor movement, nor are they associated with an optical encoder. Lablanc's Servo loops do nothing more than keep Lablanc's voice coil motors centered with regard to a set point. Lablanc's Servo loops cannot be considered an intelligent motor control processor, and particularly cannot be considered an intelligent motor control processor which independently develops motor movement commands and operative response to control signals received from a command unit, as <u>required</u> by independent Claim 6.

Further, the structure, arrangement and configuration of the Lablanc telescope system is so dissimilar to that of Krewalk, that it is not understood how Lablanc could be incorporated within Krewalk to make a functioning apparatus. Even if it were, all that would obtain would be a Krewalk apparatus with a supplemental electromagnetic motor that incorporates a Servo loop to keep it centered with respect to a set point. Any permissible combination of Krewalk and Lablanc would still not disclose, suggest or infer the present telescope system according to the invention, which includes a command unit, connected to each motor portion over a respective serial communication bus, each motor portion including a motor, an optical encoder which defines motor movement feedback signals, and an intelligent motor control processor for commanding motor movement in evaluating optical and encoding feedback signals, wherein the intelligent motor control processor independently develops motor movement commands in operative response to control signals received from the command unit.

Accordingly, Applicants respectfully submit that independent Claim 6 contains patentable subject matter over any permissible combination of Krewalk and Lablanc, and would further respectfully request reconsideration and withdrawal for the rejection of Claim 6 under 35 USC Section 103.

With regard to dependent Claims 7 and 8, they depend from independent Claim 6, and partake from the novelty thereof. Notwithstanding the foregoing, Applicants would submit that neither Krewalk nor Lablanc, nor any permissible combination of the two, are disclosed by the claimed features of the invention as set forth in independent Claims 7 and 8.

In particular, dependent Claims 7 and 8 require a separate microcontroller and microprocessor, microcontroller translating user keypad manipulation into control signals, the microprocessor posting application software program code. Krewalk only discloses a single microprocessor kernel 180. Krewalk pendant 184 is merely a user input device and is not a microcontroller. Indeed, as set forth in dependent Claim 7, the present invention differentiates

between a user input structure, a microcontroller and a microprocessor, all of which are different from a motor control processors set forth in independent Claim 6.

Additionally, Lablanc does not disclose, suggest or infer any form of processor, whether it be a microcontroller for translating user input into control signals, a microprocessor for performing high-level application software execution tasks, or an intelligent motor control processor for commanding motor movement in evaluating optical and encoder feedback information signals.

Since the structure of the present invention is not disclosed, suggested or inferred by any permissible combination of Krewalk and Lablanc, Applicants would respectfully request reconsideration and withdrawal of the rejection of these claims under 35 USC, Section 103.

Claims 9-14 were rejected under 35 USC, Section 103(a) for obviousness over Krewalk in view of Lablanc and further in view of US Patent No. 6,108,277 to Whitmore. In particular, the Examiner relies upon Krewalk in view of Lablanc for disclosing the features of Claims 6-8, while Whitmore is relied upon for disclosing the remaining features of dependent Claims 9-14.

Applicants respectfully traverse this rejection.

As set forth above, there is no permissible combination of Krewalk and Lablanc which disclose the inventive features of independent Claim 6 and dependent Claims 7 and 8. Dependent Claims 9-14 partake of the novelty thereof and are therefore patentable even in view of Whitmore. Notwithstanding the foregoing, Applicants consider Whitmore as an inappropriate obviousness reference with regard to dependent Claims 9-14 for the following reasons:

Whitmore is directed to an astrological time piece configured as a wristwatch, but which functions to indicate the signs of the zodiac and the positions of the sun and other planets at any given time. The Whitmore apparatus is unitary and self-contained in that all of its functionality is contained within a wristwatch like structure, not intended or devised to be coupled to any

exterior structure, such as a telescope. All the Whitmore apparatus is intended to do is to indicate which "house" of the zodiac will be appearing above the horizon at any given time according to a user's particular location. The geographical database suggested by the Whitmore abstract is nothing more than a "time zone" indication appropriate to astrology, and not for any other purpose.

The present invention is directed to an automated telescope system which is able to automatically orient itself with respect to a celestial coordinate system, so that the telescope is able to automatically acquire and track a specific celestial object at the command of a user. The telescope system according to the invention includes a central command processor which is able to process user input commands and issue telescope movement commands to motor control processors so as to effect acquisition and tracking of the selected celestial object. The telescope system according to the invention orients itself by having the user select an earth-based geographical location, proximate to his actual location, such that the telescope system is able to correlate the user's positional aspect with regard to the celestial coordinate system. Further, the telescope system is able to process the telescope's positional aspect, in combination with the user's geographical indicia in order to establish a coordinate reference system between the user's earth-based coordinate system and a celestial coordinate system.

The Whitmore reference has nothing to do with any of the foregoing. In particular, the Whitmore reference discloses only an ability to determine which sign of the zodiac will appear above the horizon at any given time, with respect to a user's geographical position. Further, although the Whitmore reference, in the abstract, suggests that a database of geographical coordinates might be included in the Whitmore apparatus, there is nothing in the Whitmore specification that suggests how such a database might be incorporated with the remainder of the Whitmore apparatus to give it any functionality. The Whitmore suggestion is nothing more than that; a suggestion. Whitmore does not describe how such a data base could be used even to capture the features of the Whitmore invention, much less how such a database could be used to

effect orientation of a telescope system for translating earth-based coordinates into celestial coordinates as required by dependent Claim 10.

Further, dependent Claim 11 requires that the geographical location indicia be combined with telescope motor position indications in order to define the telescope's orientation with respect to the celestial coordinate system. It is not understood how Whitmore's database or geographical locations can support this required claim element. All that Whitmore discloses is the suggestion of a database. Whitmore does not disclose telescope position indications, nor does Krewalk or Leblanc. Given the deficiencies of all of these references, it not understood how any of the foregoing references can support the combination of motor position indications with a user's geographical location indicia in order to align a telescope system.

The same is true for dependent Claim 12, wherein the automated telescope system of the invention includes means for automatically traversing the telescope to a desired celestial object and for tracking the celestial path of said celestial object without further intervention by a user. Whitmore is not understood to disclose, suggest or infer any of the foregoing since Whitmore has nothing whatever to do with automated telescope systems. Further, Whitmore has nothing whatever to do with automated telescope systems. Further, Whitmore has nothing whatever to do with identifying and tracking specific celestial objects. Whitmore discloses only an apparatus for identifying which astrological sign will appear above the horizon at any particular time of day. Astrological signs are not celestial objects. While "houses" of the zodiac may comprise stars, as we understand the term, zodiac "houses" are not stars, are not listed in any celestial catalogue, and do not comprise any object of interest to an astronomer. Thus, Whitmore is irrelevant as a reference against the automated telescope system of the invention since Whitmore discusses structure and events that are outside the scope of interest of astronomers, whether amateur or professional.

With regard to dependent Claims 13 and 14, since Whitmore cannot be applied to telescopes of any kind, Whitmore is immaterial as to whether the telescope might be provided in alt-azimuth or in a polar configuration.

Accordingly, Applicants respectfully submit that Claims 6-14 contain subject matter which is patentable over Krewalk and any permissible combination of Krewalk in view of Leblanc and Whitmore. Reconsideration and withdrawal of these claims for obviousness under 35 USC, Section 103 is respectfully solicited.

In further support of non-obviousness with regard to Claims 6-14, Applicants would respectfully submit a reprint of a May 19, 1999 article in Sky and Telescope Magazine, entitled *A "Hot" Telescope Gets Even Hotter,"* by Dennis di Cicco, and which includes an editorial by Leif J. Robinson, the Editor in Chief of Sky and Telescope Magazine, which characterizes a product, manufactured by Mean Instruments Corporation and embodying the inventive concepts set forth in the claims of this application, as "revolutionary!".

Briefly, the editorial predicts that "the ETX/AutoStar concept will go down as the greatest happening in amateur astronomy yet. Indeed, I believe it will grow the hobby on a scale heretofore unimagined." Further, the editorial notes that "the nighttime sky is now readily accessible to teachers, scout leaders, environmentalists -- anyone whose gray cells don't quit at night. If you know where north is (even roughly) and can level the telescope's tube (even roughly) the sky's the limit!"

Given that the leading journal concerned with amateur astronomy has characterized a product embodying the present application's inventive features as revolutionary and concludes that its impact on amateur astronomy and science education will be unprecedented, Applicants respectfully submit that these secondary considerations further argue strongly in favor of the subject matter of the present claims constituting a nonobvious advance over the cited art.

The particular structure, arrangement and functionality of the present invention represents such an inventive step over a spectrum of the prior art, that it has been characterized as "revolutionary." This alone should provide sufficient secondary considerations of nonobviousness to support patentability of the claims of the invention over any permissible combination of the cited art references.

Accordingly, Applicants would request reconsideration and withdrawal of the rejection of Claims 6-14 for obviousness in view of the Krewalk reference and further in view of Lablanc and Whitmore.

In view of the amendments made to the claims and the reasons for patentability set forth above, Applicants consider the application to be in condition for allowance and earnestly solicit notification of same and early passage to issue.

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Respectfully submitted,

STRADLING YOCCA CARLSON & RAUTH

By: ______________________

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JWE/mg
Enclosure: Sky and Telescope May 1999
Abstract
2 Sheets of Proposed Drawing Changes